

FORM PTO-1449 (Modified) Atty Docket No.: P02083US1A; 295620-214164 U.S. DEPARTMENT OF COMMERCE PATENT AND TRADEMARK OFFICE INFORMATION DISCLOSURE STATEMENT BY APPLICANT (Use several sheets if necessary) (37 CFR 1.98(b)) Serial No.: 10/791,177 Applicant(s): Wang et al. Filed: March 2, 2004 Group: 1796 U.S. PATENT DOCUMENTS Publication/ Patent Number Exam. Publication/ Patentee Class Subclass Filing Date Init. Issue Date 2004/ 02/19/2004 Dubertret et al. 2005/ 08/18/2005 Ziser et al. 2005/ 09/01/2005 Lin et al. 2005/ 09/08/2005 Wang et al. 2005/ g 09/29/2005 Wang et al. 2005/ 10/13/2005 Wang et al. 2005/ 12/22/2005 Bohm et al. 2006/ 04/20/2006 Lin et al. 2006/ 08/03/2006 Wang et al. 2006/ 08/03/2006 Wang et al. 2007/ 06/21/2007 Wang et al. 2007/ 06/21/2007 Wang et al. 2007/ 06/28/2007 Wang et al. 2007/ 07/12/2007 Bohm et al. 2007/ 08/09/2007 ī Hall et al. 2007/ 08/23/2007 Hall et al. 07/01/1986 Weber et al. 07/22/1986 Weber et al. 05/07/1996 Ozawa et al. 06/25/1996 Takekoshi et al. 04/21/1998 Endo et al. 04/30/2002 Cemohous et al. 05/07/2002 Wooley et al. 09/10/2002 Nelson et al. 04/27/2004 Ajbani et al. 05/18/2004 Wang 06/21/2005 Maruyama et al. 04/17/2007 Wang et al. 05/15/2007 Castner FOREIGN PATENT OR PUBLISHED FOREIGN PATENT APPLICATION Exam. Document Number Publication Translation Country or Patent Office Class Subclass Init. Date No Yes OTHER DOCUMENTS (Including Author, Title, Date**, Relevant pages, Place of Publication***) Akashi, Mitsuru et al., "Synthesis and Polymerization of a Styryl Terminated Oligovinylpyrrolidone Macromonomer", Die Angewandte Makromolekulare Chemie", 132, pp. 81-89 (1985). Alexandridis, Paschalis et al., "Amphiphilic Block Copolymers: Self-Assembly and Applications", Elsevier Science B.V., pp. 1-435 (2000). Page 1 of 4 /Robert Harlan/

03/10/2009

	Allgaier, Jurgen et al., "Synthesis and Micellar Properties of PS-PI Block Copolymers of Different Architecture", ACS Polym. Prepr. (Div Polym. Chem.), Vol. 37, No. 2, pp. 670-671 (1996).
	Antonietti, Markus et al., "Determination of the Micelle Architecture of Polystyrene/Poly(4-vinylpyridine) Block Copolymers in Dilute Solution", Macromolecules, 27, pp. 3276-3281 (1994).
	Antonietti, Markus et al., "Novel Amphiphilic Block Copolymers by Polymer Reactions and Their Use for Solubilization of Metal Salts and Metal Colloids", Macromolecules, 29, pp. 3800-3806 (1996).
	Batzilla, Thomas et al., "Formation of intra- and intermolecular crosslinks in the radical crosslinking of poly(4-vinylstyrene)", Makromol. Chem., Rapid Commun. 8, pp. 261-268 (1987).
	Bauer, B.J. et al., "Synthesis and Dilute-Solution Behavior of Model Star-Branched Polymers", Rubber Chemistry and Technology, Vol. 51, pp. 406-436 (1978).
	Berger, G. et al., "Mutual Termination of Anionic and Cationic Living' Polymers", Polymer Letters, Vol. 4, pp. 183-186 (1966).
	Bradley, John S., "The Chemistry of Transition Metal Colloids", Clusters and Colloids: From Theory to Applications, Chapter 6, Weinheim, VCH, pp. 459-544 (1994).
	Bronstein, Lyudmila M. et al., "Synthesis of Pd-, Pt-, and Rh-containing polymers derived from polystyrene-polybutadiene block copolymers; micellization of diblock copolymers due to complexation", Macromol. Chem. Phys., 199, pp. 1357-1363 (1998).
•	Borukhov, Itamar et al., "Enthalpic Stabilization of Brush-Coated Particles in a Polymer Melt", Macromolecules, Vol. 35, pp. 5171-5182 (2002).
	Braun, Hartmut et al., "Enthalpic interaction of diblock copolymers with immiscible polymer blend components", Polymer Bulletin, Vol. 32, pp. 241-248 (1994).
	Brown, H.R. et al., "Communications to the Editor: Enthalpy-Driven Swelling of a Polymer Brush", Macromolecules, Vol. 23, pp. 3383-3385 (1990).
	Cahn, John W., "Phase Separation by Spinodal Decomposition in Isotropic Systems", The Journal of Chemical Physics, Vol. 42, No. 1, pp. 93-99 (January 1, 1965).
	Calderara, Frederic et al., "Synthesis of chromophore-labelled polystyrene/poly(ethylene oxide) diblock copolymers", Makromol. Chem., 194, pp. 1411-1420 (1993).
	Chen, Ming-Qing et al., "Graft Copolymers Having Hydrophobic Backbone and Hydrophilic Branches. XXIII. Particle Size Control of Poly(ethylene glycol)- Coated Polystyrene Nanoparticles Prepared by Macromonomer Method", Journal of Polymer Science: Part A: Polymer Chemistry, Vol. 37, pp. 2155-2166 (1999).
	Chen, Ming-Qing et al., "Nanosphere Formation in Copolymerization of Methyl Methacrylate with Poly (ethylene glycol) Macromonomers", Journal of Polymer Science: Part A: Polymer Chemistry, Vol. 38, pp. 1811-1817 (2000).
	Ege, Seyhan, Organic Chemistry Structure and Reactivity, 3rd Edition, pg. 959 (1994).
	Eisenberg, Adi, "Thermodynamics, Kinetics, and Mechanisms of the Formation of Multiple Block Copolymer Morphologies", Polymer Preprints, Vol. 41 No. 2, pp. 1515-1516 (2000).
	Erhardt, Rainer et al., Macromolecules, Vol. 34, No. 4, pp. 1069-1075 (2001).
	Eschwey, Helmut et al., "Preparation and Some Properties of Star-Shaped Polymers with more than Hundred Side Chains", Die Makromolekulare Chemi 173, pp. 235-239 (1973).
	Eschwey, Helmut et al., "Star polymers from styrene and divinylbenzene", Polymer, Vol. 16, pp. 180-184 (March 1975).
	Fendler, Janos H., "Nanoparticles and Nanostructured Films: Preparation, Characterization and Applications", Wiley-VCH, pp. 1-468 (1998).
	Ferreira, Paula G. et al., "Scaling Law for Entropic Effects at Interfaces between Grafted Layers and Polymer Melts", Macromolecules, Vol. 31, pp. 3994 4003 (1998).
	Garcia, Carlos B. et al., "Self-Assembly Approach toward Magnetic Silica-Type Nanoparticles of Different Shapes from Reverse Block Copolymer Mesophases", J. Am. Chem. Soc., Vol. 125, pp. 13310-13311 (2003).
	Gay, C., "Wetting of a Polymer Brush by a Chemically Identical Polymer Melt", Macromolecules, Vol. 30, pp. 5939-5943 (1997).
	Halperin, A., "Polymeric Micelles: A Star Model", Macromolecules, Vol. 20, pp. 2943-2946 (1987).
-	Hamley, Ian W., "The Physics of Block Copolymers", Oxford Science Publication: Oxford, Chapters 3 and 4, pp. 131-265, (1998).
	Hasegawa, Ryuichi et al., "Optimum Graft Density for Dispersing Particles in Polymer Melts", Macromolecules, Vol. 29, pp. 6656-6662 (1996).
	Ishizu, Koji et al., "Synthesis of Star Polymer with Nucleus of Microgel", Polymer Journal, Vol. 12, No. 6, pp. 399-404 (1980).
	Ishizu, Koji, "Structural Ordering of Core Crosslinked Nanoparticles and Architecture of Polymeric Superstructures", ACS Polym. Prepr. (Div Polym Chem) Vol. 40, No. 1, pp. 456-457 (1999).
	Kraus, Gerard, "Mechanical Losses in Carbon-Black-Filled Rubbers", Journal of Applied Polymer Science: Applied Polymer Symposium, Vol. 39, pp. 75-92 (1984).
	Ligoure, Christian, "Adhesion between a Polymer Brush and an Elastomer: A Self-Consistent Mean Field Model", Macromolecules, Vol. 29, pp. 5459-5468 (1996).
	Liu, Guojun et al., "Diblock Copolymer Nanofibers", Macromolecules, 29, pp. 5508-5510 (1996).
	Liu, T. et al., "Formation of Amphiphilic Block Copolymer Micelles in Nonaqueous Solution", Amphiphilic Block Copolymers: Self-Assembly and Applications, Elsevier Science B.V., pp. 115-149 (2000).

Examiner	Zilliox, Jean-Georges et al., "Preparation de Macromolecules a Structure en Etoile, par Copolymerisation Anionique", J. Polymer Sci.: Part C, No. 22, pp. 145-156 (1968). Date Considered
<u> </u>	Zheng, Lei et al., "Polystyrene Nanoparticles with Anionically Polymerized Polybutadiene Brushes", Macromolecules, 37, pp. 9954-9962 (2004).
	Worsfold, D.J., "Anionic Copolymerization of Styrene with p-Divinylbenzene", Macromolecules, Vol. 3, No. 5, pp. 514-517 (September-October 1970).
	Journal of Chemistry, Vol. 47, pp. 3379-3385 (March 20, 1969).
	Polymer Chemistry, Vol. 38, pp. 1397-1407 (2000). Worsfold, Denis J. et al., "Preparation et caracterisation de polymeres-modele a structure en etoile, par copolymerisation sequencee anionique", Canadian
	Wooley, Karen L, "Shell Crosslinked Polymer Assemblies: Nanoscale Constructs Inspired from Biological Systems" Journal of Polymer Science: Part A
	Wooley, Karen L, "From Dendrimers to Knedel-like Structures", Chem. Eur. J., 3, No. 9, pp. 1397-1399 (1997)
	Vol. 27, pp. 3238-3248 (1994). Witten, T.A. et al., "Stress Relaxation in the Lamellar Copolymer Mesophase", Macromolecules, Vol. 23, pp. 824-829 (1990).
	Wijmans, C.M. et al., "Effect of Free Polymer on the Structure of a Polymer Brush and Interaction between Two Polymer Brushes", Macromolecules,
	Whitmore, Mark Douglas et al., "Theory of Micelle Formation in Block Copolymer-Homopolymer Blends", Macromolecules, Vol. 18, pp. 657-665 (1985).
	Webber, Stephen E. et al., "Solvents and Self-Organization of Polymers", NATO ASI Series, Series E: Applied Sciences, Vol. 327, pp. 1-509 (1996).
-	van der Maarel, J.R.C. et al., "Salt-Induced Contraction of Polyelectrolyte Diblock Copolymer Micelles", Langmuir, Vol. 16, No. 19, pp. 7510-7519 (2000).
	Vamvakaki, M. et al., "Synthesis of novel block and statistical methacrylate-based ionomers containing acidic, basic or betaine residues", Polymer, Vol. 39, No. 11, pp. 2331-2337 (1998).
	Tuzar, Zdenek et al., "Micelles of Block and Graft Copolymers in Solutions", Surface and Colloid Science, Vol. 15, Chapter 1, pp. 1-83 (1993).
	Tsitsilianis, Constantinos et al., "Makromol. Chem. 191, pp. 2319-2328 (1990).
	Thurmond II, K. Bruce et al., "The Study of Shell Cross-Linked Knedels (SCK), Formation and Application", ACS Polym. Prepr. (Div Polym. Chem.), Vol. 38, No. 1, pp. 62-63 (1997).
	Thurmond II, K. Bruce et al., "Water-Soluble Knedel-like Structures: The Preparation of Shell-Cross-Linked Small Particles", J. Am. Chem. Soc., Vol. 118, pp. 7239-7240 (1996).
	Stepanek, Miroslav et al. "Time-Dependent Behavior of Block Polyelectrolyte Micelles in Aqueous Media Studied by Potentiometric Titrations, QELS and Fluoroetry", Langmuir, Vo. 16, No. 6, pp. 2502-2507 (2000).
	Shull, Kenneth R., "End-Adsorbed Polymer Brushes in High- and Low-Molecular-Weight Matrices", Macromolecules, Vol. 29, pp. 2659-2666 (1996).
	Serizawa, Takeshi et al., "Transmission Electron Microscopic Study of Cross-Sectional Morphologies of Core-Corona Polymeric Nanospheres", Macromolecules, 33, pp. 1759-1764 (2000).
	Semenov, A.N., "Phase Equilibria in Block Copolymer-Homopolymer Mixtures", Macromolecules, Vol. 26, pp. 2273-2281 (1993).
	Semenov, A.N., "Theory of Diblock-Copolymer Segregation to the Interface and Free Surface of a Homopolymer Layer", Macromolecules, Vol. 25, pp. 4967-4977 (1992).
	Saito, Reiko et al., "Synthesis of Microspheres with Microphase-Separated Shells", Journal of Polymer Science: Part A: Polymer Chemistry, Vol. 38, pp. 2091-2097 (2000).
	Riess, Gerard et al., "Block Copolymers", Encyclopedia of Polymer Science and Engineering, Vol. 2, pp. 324-434 (1985).
	Rempp, Paul et al., "Grafting and Branching of Polymers", Pure Appl. Chem., Vol. 30, pp. 229-238 (1972).
	Rein, David H. et al., "Kinetics of arm-first star polymers formation in a non-polar solvent", Macromol. Chem. Phys., Vol. 199, pp. 569-574 (1998).
	Rager, Timo et al., "Micelle formation of poly(acrylic acid)- block-poly(methyl methacrylate) block copolymers in mixtures of water with organic solvents", Macromol. Chem. Phys., 200, No. 7, pp. 1672-1680 (1999).
	Price, Colin, "Colloidal Properties of Block Copolymers", Applied Science Publishers Ltd., Chapter 2, pp. 39-80 (1982).
•	Piirma, Irja, "Polymeric Surfactants", Surfactant Science Series, Vol. 42, pp. 1-289 (1992).
	Okay, Oguz et al., "Anionic Dispersion Polymerization of 1,4-Divinylbenzene", Macromolecules, 23, pp. 2623-2628 (1990).
	Okay, Oguz et al., "Steric stabilization of reactive microgels from 1,4-divinylbenzene", Makromol. Chem., Rapid Commun., Vol. 11, pp. 583-587 (1990)
•	Noolandi, Jaan et al., "Theory of Block Copolymer Micelles in Solution", Macromolecules, Vol. 16, pp. 1443-1448 (1983).
	Nace, Vaughn M., "Nonionic Surfactants: Polyoxyalkylene Block Copolymers", Surfactant Science Series, Vol. 60, pp. 1-266 (1996).
	Milner, S.T. et al., "End-Confined Polymers: Corrections to the Newtonian Limit", Macromolecules, Vol. 22, pp. 489-490 (1989).
	Milner, S.T. et al., "Theory of the Grafted Polymer Brush", Macromolecules, Vol. 21, pp. 2610-2619 (1988).
	Mi, Yongli et al., "Glass transition of nano-sized single chain globules", Polymer 43, Elsevier Science Ltd., pp. 6701-6705 (2002).
	Mayer, A.B.R. et al., "Transition metal nanoparticles protected by amphiphilic block copolymers as tailored catalyst systems", Colloid Polym. Sci., 275, pp. 333-340 (1997).
	Matsen, M.W., "Phase Behavior of Block Copolymer/Homopolymer Blends", Macromolecules, Vol. 28, pp. 5765-5773 (1995).

/Robert Harlan/ Page 3 of 4 03/10/2009

EXAMINER: Initial citation considered. Draw line through citation if not in conformance and not considered. Include copy of this form with next communication to applicant.

/Robert Harlan/

03/10/2009